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<b>(21) International Application Number:</b> PCT/US98/05642  <b>(22) International Filing Date:</b> 24 March 1998 (24.03.98)  <b>(30) Priority Data:</b> 08/827,151      27 March 1997 (27.03.97)      US  <b>(71) Applicant:</b> COLGATE-PALMOLIVE COMPANY [US/US]; 300 Park Avenue, New York, NY 10022 (US).  <b>(72) Inventor:</b> AVENDANO MUNGUIA, Maria, Esther; Tebas No. 227, Colonia Claveria, D.F. 2080 Mexico (MX).  <b>(74) Agent:</b> MIANO, Rosemary, M.; Colgate-Palmolive Company, 909 River Road, Piscataway, NJ 08855-1343 (US).		<b>(81) Designated States:</b> AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, GW, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.          Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>
<b>(54) Title:</b> TRANSPARENT AQUEOUS-BASED ROLL-ON ANTIPERSPIRANT COMPOSITION  <b>(57) Abstract</b>  Disclosed is an aqueous underarm composition such as an antiperspirant which can be dispensed from a roll-on dispenser and which composition is transparent and does not contain monohydric alcohol. The composition is in the form of a solution, whereby transparency is achieved by direct solubility, without a necessity of microemulsions or of matching refractive indices of different phases. The composition includes at least a solution of antiperspirant active material; propylene glycol; PEG-12; octoxynol-13; hydroxypropyl methylcellulose; and water. The composition desirably also includes an antibacterial agent (e.g., Triclosan) and a fragrance; and optionally also contains PPG-5-ceteth-20, dimethicone copolyol and ethylenediaminetetraacetic acid.		

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## 5 TRANSPARENT AQUEOUS-BASED ROLL-ON ANTIPERSPIRANT COMPOSITION

10 BACKGROUND OF THE INVENTION

The present invention is directed to a composition for reducing body malodor, containing antiperspirant and/or deodorant active material, to be dispensed from a roll-on dispenser. One example of the present invention is directed to a transparent antiperspirant composition to be dispensed from a roll-on dispenser.

Antiperspirant products are well known in the art. Antiperspirant products have appeared in the marketplace in varied dosage forms, such as sticks, soft solids, soft gels, roll-ons, aerosols and creams. Generally, these dosage forms include a solution of the active ingredient in a suitable solvent, a suspension of the active ingredient in a non-solvent, or a multi-phasic dispersion or emulsion in which a solution of the active ingredient is dispersed in some continuous phase or in which the solubilized active ingredient constitutes a continuous phase.

25 In antiperspirant compositions packaged in roll-on dispensers, the antiperspirant composition (for example, liquid composition containing antiperspirant active material) is provided in a reservoir having a suitable roll-on applicator above the liquid level, the roll-on applicator being rotatably mounted in the package discharge orifice  
30 whereby antiperspirant liquid discharged onto the roll-on applicator may be selectively applied to a desired area (for example, to the axillary region of a human body, by rubbing the roll-on (ball) applicator on the axillary region of the human body).

U.S. Patent No. 3,932,609 to Rosenstreich, et al., the contents of which are incorporated herein by reference in their entirety, discloses an antiperspirant liquid composition particularly suitable for use as an

5 antiperspirant roll-on composition, the composition being a liquid containing an aluminum astringent material, a small but effective amount of a quaternary ammonium salt and a select amount of water-dispersible fumed silica in an aqueous medium. This patent discloses that the presence of a select amount of fumed silica and a small but effective  
10 amount of a quaternary ammonium salt in the liquid medium stabilizes the composition, and upon application thereof allows application of a substantially uniform coating.

U.S. Patent No. 5,135,741 to Park, the contents of which are incorporated herein by reference in their entirety, discloses an  
15 antiperspirant composition of the lotion type for applying to the skin from a roll-on dispenser, containing an antiperspirant agent in the form of fine particles suspended in an anhydrous normally liquid medium by means of a suspending agent, the suspending agent including a hydrophobic clay, and the liquid medium consisting of ethanol or  
20 isopropanol or a mixture thereof and one or more liquids less volatile than ethanol or isopropanol, such less volatile liquid including a non-polar and water-immiscible liquid.

U.S. Patent No. 5,135,741 to Park requires ethanol or isopropanol or mixtures thereof. These monohydric alcohols can cause a stinging  
25 sensation, and can be irritating, when applied to human skin.

It has been desired to develop clear (transparent) antiperspirant compositions, including clear (transparent) antiperspirant compositions dispensed by a roll-on dispenser. Such compositions have increased consumer appeal, being perceived by the consumer, for example, as having  
30 greater purity than compositions which are not clear or transparent.



5           Neither of U.S. Patent No. 3,932,609 to Rosenstreich,  
et al. or U.S. Patent No. 5,135,741 to Park disclose that their  
compositions are clear or transparent. In addition, the disclosed  
compositions in these patents require a particulate material.

          U.S. Patent No. 5,393,518 to Kwass, the contents of which are  
10 incorporated herein by reference in their entirety, discloses an  
optically clear liquid antiperspirant product, capable of being  
dispensed from a roll-on type dispenser, which is an emulsion that  
includes an aqueous phase with an antiperspirant active ingredient in  
solution therein, an oil phase making up at least about 30% of the  
15 product and a stabilizing agent, the stabilizing agent having a  
substantial solubility in the aqueous and oil phases and stabilizing the  
emulsion in a temperature range from about 0° to about 45°C. The  
stabilizing agent preferably includes a polyalkoxylated alcohol and a  
lower alcohol such as ethanol, methanol or propanol that solubilizes the  
20 polyalkoxylated alcohol. The oil phase preferably includes one or a  
combination of polyether-substituted water-in-oil silicone emulsifiers  
such as cyclomethicone and dimethicone copolyol, dimethicone and  
cyclomethicone. The aqueous phase includes one or a combination of  
polar species such as water and propylene glycol and an antiperspirant  
25 active ingredient in solution. The refractive indices of the aqueous  
and oil phases are substantially matched, in order to provide clarity.

          U.S. Patent No. 5,487,887 to Benfatto, the contents of which are  
incorporated herein by reference in their entirety, discloses a clear  
antiperspirant roll-on composition which is an oil-in-water emulsion  
30 containing antiperspirant active material; water; PEG-7 glycerol  
cocoate; an emollient, preferably isopropyl myristate; and  
cyclomethicone. This patent discloses that the antiperspirant  
composition should preferably also include an organic non-resinous

5 thickener, such as PEG-150 pentaerythritol tetrastearate; an oil-in-water emulsifying system including Poloxomer 217, glycereth-7-benzoate and a nonionic surfactant for high temperature stability such as octoxynol-9 or lauric diethanolamide; a soluble electrolyte as a viscosity control agent and to enhance clarity, preferably sodium  
10 chloride; a humectant for low temperature stability, such as dipropylene glycol; and optional ingredients such as perfumes, fillers, etc.

While each of U.S. Patent No. 5,393,518 to Kwass and No. 5,487,887 to Benfatto discloses clear roll-on antiperspirant compositions, each discloses an emulsion (that is, a multi-phase composition). Such multi-  
15 phase compositions require a matching of the refractive indices of the different phases, and/or providing a microemulsion, in order to achieve clarity.

Notwithstanding the foregoing, it is still desired to provide a transparent composition to reduce body malodor, which composition will  
20 preferably contain antiperspirant active material, and will be dispensed from a roll-on dispenser, wherein transparency is achieved without the need for microemulsions and/or for refractive index matching, and wherein the composition does not contain alcohol. It is also desired to provide an aqueous-based transparent composition which contains  
25 antiperspirant active material, reduces body malodor, is dispensed from a roll-on dispenser, and achieves the cost advantages of aqueous roll-ons. It is especially desired to provide a transparent, aqueous-based antiperspirant composition which (a) can be dispensed from a roll-on dispenser, (b) achieves transparency without the need of a microemulsion  
30 and/or refractive index matching, and (c) does not require monohydric alcohols (such as ethanol) in the formulation.

5 SUMMARY OF THE INVENTION

The present invention provides a cosmetic composition, especially a transparent cosmetic composition, for underarm use (such as deodorants and antiperspirants) which is capable of reducing body malodor, can be dispensed from a roll-on dispenser, and does not require refractive index matching and/or a microemulsion to achieve transparency. The invention also provides such transparent composition packaged in a roll-on dispenser and a method of using such composition and such packaged composition. The compositions of this invention comprise:

(a) a solution comprising solvent, a moisturizer/emollient, a thickening agent, water and, optionally, a fragrance solubilizer;

(b) at least one active agent that is an antiperspirant and/or deodorant material (for example, an antiperspirant active metal salt or salts), which is:

- (i) aqueous based;
- (ii) does not require refractive index matching and/or a microemulsion in order to achieve transparency in the final product; and
- (iii) is present in the final product in a solution.

Preferably if an antiperspirant composition is formed it also contains an antibacterial (antimicrobial) agent and perfume (fragrance), as deodorant active agents. Optionally, compositions of the present invention can also contain other ingredients such as chelants, fillers, coloring agents etc.

The compositions made according to the present invention need not contain monohydric alcohol (for example, ethanol), in order to obtain a transparent antiperspirant composition. By omitting the monohydric alcohol, the compositions can be made non-stinging and non-irritating when applied to the skin.

5           The compositions according to the present invention are preferably made as solution; however, those skilled in the art will recognize that appropriate use of thickeners could form gels and creams. Transparency is achieved by direct solubility of the ingredients in, for example, the water and a glycol such as propylene glycol. This avoids multiple  
10       phases, and avoids a need for refractive index matching of the multiple phases and/or formation of microemulsions, to achieve transparency. In particular, the compositions according to the present invention are a liquid solution, which have a sufficient viscosity such that they can be packaged in a roll-on dispensing package known in the art, and applied  
15       as conventionally done utilizing roll-on dispensers.

          The compositions according to the present invention are aqueous-based (that is, contain water), providing cost advantages.

          The compositions of this invention are packaged in a conventional roll-on dispenser and used by applying these compositions using a roll-on dispenser as done conventionally (for example, by rubbing the roller  
20       ball of the roll-on dispenser against the skin, in axillary regions of the human body, in order to apply the compositions.

          Accordingly, in one embodiment of the present invention, transparent aqueous antiperspirant compositions, to be dispensed from a roll-on dispenser, can be achieved. The compositions are a solution of  
25       the ingredients, rather than a composition containing multiple phases (such as an emulsion), thereby avoiding a need for refractive index matching and/or microemulsions to achieve transparency. The compositions of the invention combine the aesthetics of transparency  
30       with the cost advantages of an aqueous roll-on antiperspirant

#### DETAILED DESCRIPTION OF THE INVENTION

          The solutions which form the base of the present invention are aqueous solutions comprising



5 (a) a solvent selected from the group consisting of propylene glycol, dipropylene glycol, tripropylene glycol and mixtures of two or all of the foregoing, with a particular solvent being propylene glycol;

(b) an emollient/moisturizer (an emollient which also has a moisturizing function) selected from the group consisting of

10 (i) a polyhydroxy (also called polyhydric) alcohol that conforms to the formula  $\text{HOCH}_2(\text{CHOH})_n\text{CH}_2\text{OH}$ , where  $n$  has a value of 1-4; examples of such compounds include  $n=1$  (a trihydric alcohol known as glycerin) and  $n=4$  (a hexahydric alcohol known as sorbitol);

(ii) ethylene oxide polymers of polyethylene glycol having  
15 a formula of  $\text{H}(\text{OCH}_2\text{CH}_2)_p\text{OH}$  such as those where  $p$  is an average value and is a number between 4 and 14; particular values for  $p$  include  $p=4$  (PEG-4) (sold by ICI Americas, Wilmington Delaware as "ICI PEG 200");  $p=6$  (PEG-6) (sold as "ICI PEG 300");  $p=8$  (PEG-8) (sold as "ICI 400");  $p=9$  (PEG-9) (also known as polyethylene glycol 450);  $p=10$  (PEG-10) (also  
20 known as polyethylene glycol 500);  $p=12$  (PEG-12) (sold as "ICI PEG 600"); and  $p=14$  (PEG-14) (also known as polyethylene glycol 14), and mixtures of the previously named compounds; and

(iii) a surfactant selected from the group consisting of silicone glycol copolymers, particularly a polymer of dimethylsiloxane  
25 known as dimethicone copolyol.

Particular values for the emollient moisturizer are the ethylene oxide polymers of polyethylene glycol especially a polymer of ethylene oxide that conforms generally to the formula  $\text{H}(\text{OCH}_2\text{CH}_2)_p\text{OH}$ , where  $p$  has an average value of 12 (also known as PEG-12) and dimethicone copolyol;

30 (c) a thickener selected from the group consisting of water soluble cellulosic polymers such as hydroxy C1-C3 alkyl celluloses and hydroxy C1-C3 alkyl (methyl)celluloses for example, hydroxyethylcellulose, hydroxypropyl methylcellulose,

5 hydroxypropylcellulose and carboxymethylcellulose, especially hydroxypropyl methylcellulose and hydroxyethylcellulose.

Optionally other ingredients may also be added. Such ingredients include fragrances; fragrance solubilizers (for example, an ethoxylated alkyl phenol that conforms generally to the formula  $C_8H_{17}C_6H_4(OCH_2CH_2)_rOH$  where r has an average value of 13 (also called octoxynol-13), the polyethylene glycol ether of lauryl alcohol that conforms to the formula  $CH_3(CH_2)_{10}CH_2(OCH_2CH_2)_zOH$  where z has an average value of 23 (also called laureth-23) and the polyoxypropylene, polyoxyethylene ether of cetyl alcohol that conforms generally to the formula  $CH_3(CH_2)_{14}CH_2(OCH(CH_3)CH_2)_x(OCH_2CH_2)_yOH$  where x has an average value of 5 and y has an average value of 20 (also called PPG-5-ceteth-20)); chelants such as ethylenediaminetetraacetic acid (EDTA); an antibacterial (antimicrobial) agent such Triclosan; and a suitable fragrance, preferably one that does not contain terpenes, sesquiterpenes, resinoids, heliotropin, benzyl benzoate or salicylates; and coloring agents such as those approved by the United States Food and Drug Administration and known as FD&C and D&C colors.

A particular embodiment is an antiperspirant comprising the following formulation (in percent by weight):

25	Hydroxypropyl methylcellulose	1.0-3.0
	Propylene glycol	10-20
	Triclosan (IRGAZAN DP-300)	0.02-0.05
	Aluminum chlorohydrate (50% solution)	30-35
	Octoxynol-13 (TRITON X-102)	0.5-2.0
30	Fragrance (deterpenated)	0.6-1.0
	Water	remainder up to 100

In one embodiment, 1.1-1.3 percent of hydroxypropyl methylcellulose is used with 10.0 percent propylene glycol, .02 percent

5 Triclosan, 32.0 percent aluminum chlorohydrate (50% solution), 0.7-2.0 percent octoxynol-13, 1.0 percent fragrance and the remainder water up to 100 percent.

One embodiment of the present invention contemplates a transparent aqueous-based composition, for reduction of body malodor (for example, a  
10 transparent aqueous-based antiperspirant composition), to be dispensed by a roll-on dispenser, containing at least an antiperspirant active material in solution, wherein the solution comprises propylene glycol as the solvent; and PEG-12 as the emollient/moisturizer; and wherein the thickener is selected from the group consisting of at least one  
15 hydroxyalkyl cellulose selected from the group consisting of hydroxyethyl cellulose and hydroxypropyl methylcellulose (preferably hydroxypropyl methylcellulose) and water.

While the present invention is described in connection with specific and preferred embodiments, it will be understood that it is not  
20 intended to limit the invention to those embodiments. To the contrary, it is intended to cover all alterations, modifications and equivalents as may be included within the spirit and scope of the invention as defined by the appended claims.

Throughout the disclosure, the present invention is described  
25 primarily in connection with transparent antiperspirant compositions, to be dispensed using a roll-on dispenser. However, the present invention is not limited to such compositions; for example, compositions according to the present invention can be deodorant compositions.

Collectively antiperspirant compositions and deodorant  
30 compositions are referred to herein as underarm compositions.

Throughout the present specification, where compositions are described as including or comprising specific components or materials, or where methods are described as including or comprising specific

5 steps, it is contemplated that the compositions of the present invention can also consist essentially of, or consist of, the recited components or materials, and that the methods of the present invention can also consist essentially of, or consist of, the recited steps.

A feature of the present invention is that a clear or transparent  
10 antiperspirant composition can be provided. The term clear or transparent (that is, clarity), according to the present invention, is intended to connote its usual dictionary definition; thus, a clear antiperspirant composition (for example, a liquid composition according to the present invention) allows ready viewing of objects behind it. By  
15 contrast, a translucent composition, although allowing light to pass through, causes the light to be so scattered that it would be impossible to see clearly objects behind the composition (for example, where the composition is packaged in a transparent container). Opaque compositions do not allow a substantial amount of light to pass  
20 therethrough. Thus, there is a difference among transparent (clear), translucent and opaque compositions.

Throughout the present disclosure, various of the components of the disclosed compositions are denoted by their name in the CTFA International Cosmetic Ingredient Dictionary (4th Ed. 1991), the  
25 contents of which are incorporated herein by reference in their entirety.

In the present disclosure, where amounts of components of the compositions are expressed by percent, these amounts are in percent by weight, of the component, relative to the total weight of the  
30 composition.

Preferably, the composition also includes at least one deodorant active ingredient selected from (but not limited to) antibacterial (antimicrobial) agents and fragrance.

5            Optionally, the compositions further include PPG-5-ceteth-20, dimethicone copolyol, and ethylenediaminetetraacetic acid (EDTA).

          Throughout the present specification, "deodorant active" materials and "antiperspirant active" materials are discussed. Both types of materials contribute to reduction of body (for example, axillary) malodor. By reduction of body malodor is meant that, generally, there is less body malodor after application of the composition to a person's skin, as compared to body malodor of the person without application of the composition. Such reduction can be due to a masking of the malodor, absorption and/or chemical reaction of the malodorous material, reduction of levels of the bacteria producing the malodorous materials, for example, from perspiration, reduction of perspiration, etc. The antiperspirant materials, when utilized in appropriate amounts, primarily act to reduce body malodor by reducing production of perspiration; the antiperspirant materials can also have a deodorant function, for example, as an antimicrobial (antibacterial) agent. The deodorant active materials do not substantially reduce the production of perspiration, but reduce malodor in other ways, for example, as fragrances masking the malodor or reducing the malodor intensity, as odor absorbents, as antimicrobial (antibacterial) agents, as agents chemically reacting with malodorous materials, etc.

          Known antiperspirant active materials can be utilized in the composition of the present invention. Suitable materials which may be mentioned by way of example include aluminum chlorohydrate, aluminum chloride, aluminum sesquichlorohydrate, aluminum-zirconium hydroxychlorides, complexes or adducts of the above-mentioned active ingredients with one or more glycols, such as propylene glycol, dipropylene glycol tripropylene glycol and combinations thereof. Known aluminum-zirconium salts in combination with neutral amino acids, such as glycine (for example, aluminum-zirconium tetrachlorohydrate Gly), can

5 also be used. Generally, any of the Category I active antiperspirant ingredients, listed in the Food and Drug Administration's Monograph On Antiperspirant Drug Products For Over-The-Counter Human Use (October 10, 1973), which is incorporated by reference in its entirety herein, can be used. Some of these include aluminum chlorohydrate, aluminum zirconium  
10 octachlorohydrate, aluminum zirconium octachlorohydrate glycine, aluminum zirconium pentachlorohydrate, aluminum zirconium pentachlorohydrate glycine, aluminum zirconium tetrachlorohydrate, aluminum zirconium tetrachlorohydrate glycine, aluminum zirconium trichlorohydrate, aluminum zirconium trichlorohydrate glycine, with aluminum chlorohydrate and  
15 aluminum zirconium tetrachlorohydrate glycine being the more preferred antiperspirant ingredients. In addition, any new drug, not listed in the Monograph, such as aluminum nitrate hydrate and its combination with zirconyl hydroxychlorides and nitrates, or aluminum-stannous chlorohydrates, can be incorporated as an antiperspirant active  
20 ingredient in compositions, including antiperspirant compositions, according to the present invention.

The amount of active component used will vary with the particular active ingredient incorporated. It is important that the active antiperspirant material be dissolved in the compositions of the present  
25 invention. For example, the active antiperspirant material utilized in the compositions of the present invention can be pre-dissolved in water or in another solvent (for example, in propylene glycol, dipropylene glycol and/or tripropylene glycol), and incorporated in the present compositions while in such solution. In general, the active  
30 antiperspirant material should be included in an amount from at least about 10% by weight, of the total weight of the composition, and preferably in the range of 15 - 20 percent in order to have an antiperspirant effect (that is, achieve reduction of perspiration flow). However, as indicated previously, the antiperspirant active material can

5 be utilized in lesser amounts providing an antibacterial (antimicrobial) effect. In such a case the relative amounts of antiperspirant active ingredient and deodorant ingredient can be in the range of at least about 15 percent for the antiperspirant and in the range of at least about 8. percent for the deodorant. In one embodiment of the invention,  
10 the antiperspirant active can be used in an amount of 15 percent in combination with a deodorant in an amount of 0.02 to 0.05 percent based on the total weight of the underarm composition.

For convenience, solutions of 50% concentration are described here. It is understood by those skilled in the art that when a 50%  
15 solution is used, this means the same amount of active can be added by substituting a different concentration.

The glycol such as propylene glycol, dipropylene glycol and/or tripropylene glycol acts, in combination with the water, as a solvent for the present composition. Both the glycol such as propylene glycol  
20 and water are essential components of compositions of the present invention.

Emollients such as PEG-12 are used in the compositions of the invention as noted above.

The hydroxypropyl methylcellulose is a propylene glycol ether of  
25 methylcellulose (methylcellulose being the methyl ether of cellulose); it is a thickening agent in the present compositions, so as to provide compositions of desired viscosity (for example, sufficient viscosity to be dispensed from a roll-on dispenser). Hydroxyethyl cellulose is the ethylene glycol ether of cellulose and may also be used. As for  
30 desirable viscosities for roll-on compositions, see, for example, U.S. Patent No. 5,393,518 to Kwass and No. 5,487,887 to Benfatto, the contents of each of which have been incorporated herein by reference in

5 their entirety. Viscosities useful in the compositions of this invention include those in the range of 1000 to 4000 centipoise (CPS), with a range of 1500 to 3000 CPS being preferred.

Appropriate deodorant active materials can be incorporated in the compositions of the present invention, so as to incorporate deodorant  
10 active materials for reducing body malodor. It is believed that optionally fragrances can be incorporated into the compositions as well as known antibacterial (antimicrobial) agents, such as (but not limited to) Triclosan (a substituted organic ether that conforms generally to the formula  $C_{12}H_7Cl_3O_2$ ) can be incorporated in the compositions of the  
15 present invention.

Optionally, the compositions according to the present invention can also include PPG-5-ceteth-20, dimethicone copolyol and/or EDTA. Also, when fragrance is used, it is helpful to include a material such as octoxynol 13 as a fragrance solubilizer.

20 Dimethicone copolyol is a polymer of dimethylsiloxane with polyoxyethylene and/or polyoxypropylene side chains.

As for amounts of each of the components incorporated in compositions of the present invention, see the following Table 1. These amounts are illustrative, and are not limiting of the present invention.

25

TABLE 1

<u>INGREDIENT</u>	<u>WEIGHT PERCENT</u>
Hydroxypropyl Methylcellulose	1.0 - 3.0
30 Propylene Glycol	10.0 - 20.0
PEG-12	2.0 - 4.0
Antiperspirant Active Material in Solution (50%)	30.0 - 35.0
Antibacterial Agent	0.02 - 0.05
PPG 5-Ceteth-20	0.0 - 3.0
35 Octoxynol-13	0.5 - 2.0
Dimethicone Copolyol	0.0 - 3.0
EDTA	0.0 - 0.3
Fragrance	0.5 - 1.0
Water	Add to make 100





5           Compositions according to the present invention can be made by mixing the various components together at, for example, elevated temperature (for example 85 to 90 degrees C) so as to form a solution (water and propylene glycol, for example, being solvents in the solution), and then pouring the resulting solution into packages (for  
10   example, bottles) to be closed off with conventional roll-on applicators (conventional ball or elongated ball applicators or some other type of roll-on applicators).

          In one process for making compositions in accordance with the present invention, a suitable vessel is provided with an agitator and  
15   heating source. Water is placed in the vessel and heated to about 85-90 degrees C. Hydroxypropyl methylcellulose is added while agitating the mixture to allow thorough dispersion. A Triclosan (such as IRGAZAN DP-300 sold by CIBA-GEIGY, Greensboro, North Carolina) may be added as described below. A moisturizer/emollient such as PEG-12 is added and  
20   the mixing is continued until the mixture is homogeneous. A selected amount of an aluminum chlorohydrate solution (such as from 30 -35 percent (particularly 32 percent) of a 50% solution) is added with mixing and the mixture is cooled to 55-60 degrees C. A perfume premix such as the one described below is then added and the mixture is cooled  
25   to 10-20 degrees C, preferably 15-20 degrees C, and most preferably, 15 degrees C. This cooling step has been found preferable to obtain the best transparency and the optimum viscosity. Optionally other ingredients can be added such as EDTA as a chelant up to an amount of 0-0.3 and, more particularly, in an amount of at least 0.02-0.05 percent.

30           In another process water can be placed in the vessel and heated to about 70-75 degrees C.. Hydroxypropyl methylcellulose is added and dispersed with agitation. In another vessel, deterpenated fragrance is mixed with octoxynol-13. The mixture of the main vessel is cooled to

5 50-55 degrees C. and the premix of the fragrance is added. The product continues cooling and when it reaches about 20-25 degrees C the solution starts to form. The hydroxypropyl methylcellulose goes into solution at that temperature. In another vessel, Triclosan is dissolved in propylene glycol. Once the hydroxypropyl methylcellulose is dissolved,  
10 cooling is stopped and PEG-12 is added, then the propylene glycol/Triclosan premix is added, followed by the aluminum chlorohydrate in solution. The product is agitated until clarity is obtained. Using this method a product can be prepared with a viscosity of 1520 cps and a pH of 3.97 with good transparency.

15 PPG 5-ceteth-20 can be used instead of octoxynol 13 depending on the type of fragrance used. The selection is made to obtain the best stability of the fragrance.

In general, for either of the methods described above EDTA and dimethicone copolyol can be added in an amount of 0.02-0.3 percent EDTA  
20 and 0.1-3 percent dimethicone copolymer.

The compositions according to the present invention are used in the same manner as conventional roll-on compositions, dispensed from, for example, dispensing packages having a roll-on applicator. For example, a cap covering the roll-on applicator is removed, the portion  
25 of the applicator ball facing the composition is wetted by the composition (for example, by inverting the package) and the roll-on applicator (for example, ball or elongated ball) is rubbed on the skin, so as to deposit the active material (for example, antiperspirant and/or deodorant active material) on the skin. Illustratively, where the  
30 composition is an antiperspirant composition containing an antiperspirant active material for reducing perspiration in the axillary regions, the applicator ball is rubbed against the axillary regions of

5 the human body, so as to deposit the antiperspirant active material and, if present, deodorant active material, on the skin in the axillary regions.

As for a known elongated (wide) roll-on type dispenser, see U.S. Patent No. 4,984,921 to Fattori, the contents of which are incorporated  
10 herein by reference in their entirety.

Thus, according to the present invention, a transparent aqueous-based antiperspirant composition, to be dispensed using a roll-on dispenser, is achieved. The composition combines the aesthetics of transparency with cost advantages of an aqueous roll-on antiperspirant.  
15 In addition, the composition is a solution, avoiding the need of refractory index matching and/or forming microemulsions in order to achieve transparency. Furthermore, the composition according to the present invention need not contain monohydric alcohol (such as ethanol), making the present composition non-stinging and non-irritating when  
20 applied to the skin.

By way of examples of the invention, the following nonlimiting examples are included. Definitions and chemical and scientific symbols used in the Examples and elsewhere in this document have their usual and customary meanings. Unless indicated otherwise all amounts are in  
25 percent by weight based on the total weight of the final composition.

For the Examples:

"IRGAZAN Premix" means a mixture made by dissolving a selected amount of IRGAZAN brand Triclosan in a selected amount of propylene glycol with agitation. For Examples 2-4, 10.00% by weight (based on the  
30 total mixture of the final product made) and 0.02% Triclosan were used.

"Perfume Premix" means a mixture of a selected amount of a perfume with octoxynol 13. For Examples 2-4, 1.00% by weight (based on the

5 total weight of the final product) perfume and 2.00% by weight of octoxynol were mixed with agitation and used. PPG 5 ceteth 20 can be used instead of octoxynol 13 depending on the type of fragrance used.

Unless otherwise indicated, all percents described in this application are weight percents; degrees C are used; and chemical  
10 symbols and abbreviations have their usual and customary meanings.

#### EXAMPLE 1

##### Batch Process

In a suitable vessel provided with an agitator and heating source  
15 water ( selected amount) is placed. The water is heated to about 85-90 degrees C. Hydroxypropyl methyl cellulose or hydroxyethyl cellulose (selected amount) is added while agitating the mixture to allow thorough dispersion. IRGAZAN Premix and PEG-12 (2%) are added and the mixing is continued until the mixture is homogeneous. A 50% aluminum  
20 chlorohydrate solution (selected amount) is added with mixing and the mixture is cooled to 55-60 degrees C. The Perfume Premix is then added and the mixture is cooled to 15 degrees C. This cooling step has been found preferable to obtain the best transparency and the optimum viscosity. PPG 5-ceteth-20 can be used instead of octoxynol 13 in the  
25 Perfume Premix depending on the type of fragrance used.

Optionally EDTA and dimethicone copolyol can be added in an amount of 0.02-0.3 percent EDTA and 0.1-3 percent dimethicone copolyol.



5

## EXAMPLE 2

The method described in Example 1 was used with the following amounts of material:

	Water -	51.88%
	Hydroxypropyl methylcellulose -	1.10%
10	PEG-12 -	2.00%
	Aluminum chlorohydrate (50% solution) -	32.00%
	Fragrance .	1.00%
15	Octoxynol 13 -	2.00%
	Propylene glycol -	10.00%
	Triclosan -	0.02%

In this Example an aluminum chlorohydrate with an iron content not exceeding 50 parts per million (ppm) is used. The final product is very clear and the color is white. The viscosity of the product is 2,200 CPS, the pH is 4.02 and the product was stable after 12 weeks.

## EXAMPLE 3

25 The method described in Example 1 was used with the following amounts of material:

	Water -	51.86%
	Hydroxypropyl methylcellulose -	1.10%
	PEG-12 -	2.00%
30	Aluminum chlorohydrate (50% solution) -	32.00%
	Fragrance -	1.00%
35	Octoxynol 13 -	2.00%

5	Propylene glycol -	10.00%
	Triclosan -	0.02%
	EDTA -	0.02%

10 In this Example 0.02% EDTA was also added. This was done by adding EDTA to the water at 85-90 degrees C before the addition of hydroxypropyl methyl cellulose. The final product had a good transparency and a white color. The viscosity of the product was 2,350 CPS and the pH was 3.98.

#### EXAMPLE 4

15 The method described in Example 2 was repeated except that 51.98% of water was used instead of 51.88%, and 1.00% of hydroxyethyl cellulose was used instead of hydroxypropyl methylcellulose. The final composition had a good transparency. The color was a little yellowish but still acceptable. The viscosity was 3100 CPS and the pH was 3.96.

20 While several embodiments in accordance with the present invention have been shown and described, it is understood that the same is not limited thereto, but is susceptible to numerous changes and modifications as known to one having ordinary skill in the art. It is intended to cover such modifications which are within the spirit and  
25 scope of the invention.

5    WHAT IS CLAIMED IS:

1.    A cosmetic composition comprising
  - (a) a solution comprising solvent, an emollient/moisturizer, a thickening agent and water;
  - (b) at least one active agent selected from the group consisting
- 10 of antiperspirants and deodorants which is:
  - (i) aqueous based;
  - (ii) does not require refractive index matching or a microemulsion in order to achieve transparency in a final cosmetic composition; and
  - 15 (iii) is present in the final product.
2.    A composition according to Claim 1 wherein the solvent is selected from the group consisting of propylene glycol, dipropylene glycol, tripropylene glycol and mixtures of two or all of the foregoing.
- 20 3.    A composition according to Claim 1 wherein the moisturizer/emollient is selected from the group consisting of
  - (a) a polyhydric alcohol that conforms to the formula  $\text{HOCH}_2(\text{CHOH})_n\text{CH}_2\text{OH}$ , where n has a value of 1-4;
  - 25 (b) at least one ethylene oxide polymers of polyethylene glycol having a formula of  $\text{H}(\text{OCH}_2\text{CH}_2)_p\text{OH}$  where p is an average value and is a number between 4 and 14; and mixtures of the ethylene oxide polymers; and
  - (c) a surfactant selected from the group consisting of
- 30 silicone glycol copolymers.
4.    A composition according to Claim 3 wherein the surfactant is, a polymer of dimethylsiloxane known as dimethicone copolyol.

5

5. A composition according to Claim 2 wherein the at least one ethylene oxide polymer of polyethylene glycol is selected from the group consisting of PEG-4, PEG-6, PEG-8, PEG-9, PEG-10, PEG-12, PEG-14, and mixtures of these polymers.

10

6. A composition according to Claim 1 wherein the thickening agent is selected from the group consisting of hydroxy C1-C3 alkyl celluloses and hydroxy C1-C3 alkyl methyl celluloses.

15

7. A composition according to Claim 1 wherein the active agent is selected from the group consisting of aluminum chlorohydrate; aluminum chloride; aluminum sesquichlorohydrate; aluminum-zirconium hydroxychlorides; complexes and adducts of said active agents with at least one glycol selected from the group consisting of propylene glycol, dipropylene glycol tripropylene glycol and combinations thereof; and aluminum-zirconium salts in combination with neutral amino acids.

20

8. A composition according to Claim 7 wherein the active agent is selected from the group consisting of aluminum chlorohydrate, aluminum zirconium octachlorohydrate, aluminum zirconium octachlorohydrate glycine, aluminum zirconium pentachlorohydrate, aluminum zirconium pentachlorohydrate glycine, aluminum zirconium tetrachlorohydrate, aluminum zirconium tetrachlorohydrate glycine, aluminum zirconium trichlorohydrate, aluminum zirconium trichlorohydrate glycine, aluminum nitrate hydrate and its combination with zirconium hydroxychlorides and nitrates, and aluminum-stannous chlorohydrates.

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9. A composition according to Claim 1, wherein the composition is a solution.





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10. A composition according to Claim 1, wherein the composition is transparent.

11. A composition according to Claim 1, wherein the composition  
10 further includes an antibacterial agent.

12. A composition according to Claim 1, wherein the composition further includes a fragrance.

13. A composition according to Claim 11, wherein the  
15 antibacterial agent is Triclosan.

14. A composition according to Claim 12 further comprising a fragrance solubilizer.

20

15. A composition according to Claim 14 wherein the fragrance solubilizer is selected from the group consisting of an ethoxylated alkyl phenol that conforms generally to the formula  $C_{18}H_{17}C_6H_4(OCH_2CH_2)_rOH$  where r has an average value of 13; the polyethylene glycol ether of  
25 lauryl alcohol that conforms to the formula  $CH_3(CH_2)_{10}CH_2(OCH_2CH_2)_zOH$  where z has an average value of 23; and the polyoxypropylene, polyoxyethylene ether of cetyl alcohol that conforms generally to the formula  $CH_3(CH_2)_{14}CH_2(OCH(CH_3)CH_2)_x(OCH_2CH_2)_yOH$  where x has an average value of 5 and y has an average value of 20.

30

16. A composition according to Claim 15, wherein the fragrance solubilizer is PPG-5-ceteth-20, and wherein the composition further comprises at least one of dimethicone copolyol and ethylenediaminetetraacetic acid.

5

17. A composition according to Claim 1, wherein the composition includes, in percent by weight of the total weight of the composition, up to 3.0 PPG-5 ceteth-20, up to 3.0% dimethicone copolyol, up to 0.3% ethylenediaminetetraacetic acid, 0.02-0.05% antibacterial agent and 0.5-  
10 1.0% fragrance.

18. An aqueous antiperspirant composition according to Claim 1, wherein the composition includes a solution of the antiperspirant active material, and includes, in percent by weight of the total weight of the  
15 composition, 30.0-35.0% of a 50% solution of antiperspirant active material or its equivalent, 10.0-20.0% propylene glycol; 2.0-4.0% PEG-12; 0.5-2.0% octoxynol-13; 1.0-3.0% hydroxypropyl methylcellulose; and balance water up to 100 percent.

20 19. An aqueous antiperspirant composition according to Claim 1, wherein the composition also includes an antibacterial agent.

20. An aqueous antiperspirant composition according to Claim 1, wherein the composition contains no monohydric alcohol.

25

21. An aqueous antiperspirant composition according to Claim 1, wherein the composition is a transparent liquid solution.

22. An aqueous antiperspirant composition, comprising, in  
30 percent by weight of the total weight of the composition:

- (a) 30.0 - 35.0% of a 50% solution of antiperspirant active material or its equivalent;
- (b) 10.0 - 20.0% propylene glycol;
- (c) 2.0 - 4.0% PEG-12;

- 5 (d) 0.5 - 2.0% octoxynol-13;  
(e) 1.0 - 3.0% hydroxypropyl methylcellulose;  
(f) 0.02 - 0.05% Triclosan;  
(g) 0.5 - 1.0% fragrance;  
(h) 0 - 3.0% PPG-5-ceteth-20;  
10 (i) 0 - 3.0% dimethicone copolyol;  
(j) 0 - 0.3% ethylenediaminetetraacetic acid; and  
(k) balance water to make 100%.

23. An aqueous antiperspirant composition according to Claim 22,  
15 the composition being a transparent liquid solution.

24. An aqueous antiperspirant composition according to Claim 1  
wherein the composition is a solution which comprises a sufficient  
amount of antiperspirant active material so as to reduce flow of  
20 perspiration from axillary regions of a person.

25. An aqueous antiperspirant composition according to Claim 24,  
wherein the antiperspirant active material is aluminum chlorohydrate

25 26. A packaged composition, comprising:  
(a) a roll-on dispenser package; and  
(b) the aqueous antiperspirant composition according to  
Claim 1, in the dispenser package.

30 27. A packaged composition, comprising:  
(a) a roll-on dispenser package; and  
(b) the aqueous composition according to Claim 24, in the  
dispenser package.

5

28. A packaged antiperspirant composition, comprising:

(a) a roll-on dispenser package; and

(b) the aqueous antiperspirant composition according to Claim 25 in the dispenser package.

10

29. A packaged antiperspirant composition, comprising:

(a) a roll-on dispenser package; and

(b) the aqueous antiperspirant composition according to Claim 2, in the dispenser package.

15

30. A method of reducing body malodor of a person, comprising the step of applying the aqueous antiperspirant composition according to Claim 20 to axillary regions of the person.

20

31. A method of reducing body malodor of a person, comprising the step of applying the aqueous composition according to Claim 1 to axillary regions of the person.

32. A method of reducing body malodor of a person, comprising the step of applying the aqueous antiperspirant composition according to Claim 2 to axillary regions of the person.

33. A method of reducing body malodor of a person, comprising the step of applying the aqueous antiperspirant composition according to Claim 24 to axillary regions of the person.

34. A method of reducing body malodor of a person, comprising the step of applying the aqueous antiperspirant composition according to Claim 25 to axillary regions of the person.

5

35. An aqueous underarm antiperspirant composition, to be dispensed from a roll-on dispenser, comprising:

(a) at least one of an antiperspirant or deodorant active material in an amount sufficient to reduce odor when used in an axillary area;

- (b) propylene glycol;
- (c) PEG-12;
- (d) octoxynol-13;
- (e) hydroxypropyl methylcellulose; and
- (f) water.

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36. The aqueous antiperspirant composition according to Claim 1, wherein the composition is made by using a solution of the antiperspirant active material, and is made by combining in percent by weight of the total weight of the composition, 30.0-35.0% of a 50 percent solution of antiperspirant active material (or its equivalent), 10.0-20.0% propylene glycol; 2.0-4.0% PEG-12; 0.5-2.0% octoxynol-13; 1.0-3.0% hydroxypropyl methylcellulose; and balance of water up to 100 percent.

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37. A cosmetic composition made by combining

(a) a solution comprising solvent, a moisturizer/emollient, a thickening agent and water;

(b) at least one active agent selected from the group consisting of antiperspirants and deodorants which is:

- (i) aqueous based;
- (ii) does not require refractive index matching or a microemulsion in order to achieve transparency in a final cosmetic composition; and

5 (iii) is present in the final product.

38. A composition according to Claim 1 which is a gel.

39. A composition according to Claim 1 which is a cream.

10

40. A composition made by combining in percent by weight of the total weight of the composition, 30.0-35.0% of a 50 percent solution of antiperspirant active material (or its equivalent), 10.0-20.0% propylene glycol; 2.0-4.0% PEG-12; 0.5-2.0% octoxynol-13; 1.0-3.0% hydroxypropyl  
15 methylcellulose; and balance of water up to 100 percent.

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 98/05642

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 A61K7/32

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P, X	<p>WO 97 31618 A (FORD ANDREW ; GILLETTE CO (US); WELLS DAVID S (US)) 4 September 1997</p> <p>see page 1, line 6-8  see page 3, line 23-25  see page 5, line 33-37  see page 6, line 1-7  see page 7, line 12-37  see examples 2-8</p> <p style="text-align: center;">--- -/--</p>	<p>1-4,  6-10, 12,  20, 21,  24, 25,  30-34,  37-39</p>

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>WO 96 26709 A (GILLETTE CO ; VU TUAN M (US); IOVANNI CARL F (US); SANE JAYANT N (U) 6 September 1996</p> <p>see page 1, line 4-8  see page 2, line 10-27  see page 3, line 32-37  see page 4, line 1-6  see page 5, line 17-37  see page 8, line 31-33  see page 10, line 25  see page 10, line 34-35  see examples 2-8</p> <p>---</p>	<p>1-4,  6-10, 12,  20, 21,  24, 25,  30-34,  37-39</p>
X	<p>US 4 383 988 A (J.TENG) 17 May 1983</p> <p>see the whole document</p> <p>---</p>	<p>1, 6-10,  12, 14,  21,  24-28,  31, 33,  34, 37, 38</p>
P, X	<p>US 5 650 143 A (BERGMANN WOLFGANG R ET AL) 22 July 1997</p> <p>see column 2, line 20-68  see column 3, line 1-17</p> <p>---</p>	<p>1-4,  9-13, 19,  20,  30-32, 37</p>
A	<p>US 5 575 990 A (BENFATTO ANTHONY) 19 November 1996</p> <p>see the whole document</p> <p>---</p>	<p>1-40</p>
A	<p>WO 97 06777 A (MENNEN CO) 27 February 1997</p> <p>see the whole document</p> <p>-----</p>	<p>1-40</p>



# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 98/05642

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
WO 9731618	A	04-09-1997	US	5723135 A	03-03-1998
			AU	2258097 A	16-09-1997
WO 9626709	A	06-09-1996	US	5725846 A	10-03-1998
			AU	5301096 A	18-09-1996
			BR	9607142 A	25-11-1997
			CA	2214577 A	06-09-1996
			CN	1181005 A	06-05-1998
			EP	0812183 A	17-12-1997
			US	5705171 A	06-01-1998
			ZA	9601649 A	16-07-1996
US 4383988	A	17-05-1983	NONE		
US 5650143	A	22-07-1997	AU	2217497 A	05-01-1998
			WO	9745093 A	04-12-1997
US 5575990	A	19-11-1996	US	5487887 A	30-01-1996
			AU	4109896 A	21-08-1996
			CA	2212187 A	08-08-1996
			CN	1175207 A	04-03-1998
			EP	0801556 A	22-10-1997
			WO	9623483 A	08-08-1996
WO 9706777	A	27-02-1997	AU	6718296 A	12-03-1997
			EP	0845977 A	10-06-1998

